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Abstract

CANADIAN RESERVES OF URANIUM AND THORIUM

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1. The rapid growth of the Canadian uranium industry in the post-war period will stand out as a remarkable achievement in Canadian mining history. But the recent decline in production, resulting from declining export markets, has been almost as rapid as the spectacular rise during the 1950's. At one time there were 25 mines and 19 treatment plants in operation, but now only one mine is expected to continue operating beyond 1967. Despite the severe contraction in production, virtually no loss of reserves will result from mine closures.

2. The exploration for uranium and thorium in Canada lasted for a very short time but, during the period 1950 to 1956, it resulted in the discovery of more than 10 000 radioactive occurrences among which was one of the largest known deposits in the world. Only a few of these occurrences reached the stage of production although a larger number were of considerable economic interest. The most important discoveries were the quartz-pebble conglomerates of the Blind River - Elliot Lake district of Ontario, the pitchblende-bearing vein deposits of the Beaverlodge Lake area in northern Saskatchewan and the pegmatitic granite dyke deposits near Bancroft in southeastern Ontario.

3. The present reserves of measured, indicated and inferred ore in Canada are 240×10^6 tonnes averaging 1.24 kg U_3O_8/tonne. This is equivalent to 222 000 tonnes of recoverable U_3O_8 or about 190 000 tonnes of uranium metal after deducting 20% for unrecoverable ore in pillars and 5% for ore-treatment losses. These reserves are based on a price for U_3O_8 ranging from $11 to about $17.50 a kilogram. Since 1953, a total of 57×10^6 tonnes of ore (containing 73 500 tonnes of U_3O_8) has been mined and milled. In addition to these reserves, the volume of lower-grade material, that is material ranging from 0.15 to 0.85 kg U_3O_8/tonne, is considered by the writers to be at least as large as the above-stated reserves. Most of this potential ore is in the Elliot Lake camp.

4. Occurrences of uranium and thorium are widespread, but most are in the Canadian Shield, particularly in its margins. Based on past experience in prospecting for uranium in Canada, and the extent of

unexplored areas which are considered to be geologically favorable, estimates of tonnages in possible future discoveries of ore and of resources of lower-grade material are given. The prospects of finding more ore are therefore considered to be favorable and additional prospecting should be done in the areas suggested using techniques explained in the paper.

5. Thorium is discussed also because it occurs with uranium in two of the principal deposits and is therefore inexpensive to recover as a by-product. Reasonably assured reserves of thorium "in place" are estimated at 145 000 tonnes of ThO_2. In addition to these reserves there are about 23 000 tonnes of ThO_2 in dumps of mill tailings.